



## **Symmetry in Evolutionary Computation and Reinforcement Learning**

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### **Message from the Guest Editors**

Evolutionary computation and reinforcement learning are two distinct but related fields in machine learning and optimization. Symmetry is an important concept that has been studied in the fields of evolutionary computation and reinforcement learning. In evolutionary computation, symmetry can be exploited to improve the efficiency and performance of optimization algorithms. Symmetric representations of candidate solutions can reduce the search space and allow for more effective exploration. Researchers have investigated ways to incorporate symmetry into genetic algorithms, evolution strategies, and other evolutionary techniques. In reinforcement learning, symmetry can be leveraged to generalize learning across similar states or actions. If an agent encounters a state that is symmetric to a previously visited state, it can apply the same learned policy or value function.

The interplay between evolutionary computation and reinforcement learning, combined with the consideration of symmetry, has led to advancements in various applications, including robotics, cryptography, and optimization.





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## Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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